

INTRODUCTION

- Falls are one of the leading causes of both fatal and non-fatal injuries in various populations such as geriatric, clinical, occupational, and even athletic populations.
- Virtual reality (VR) technology has been constantly evolving and more recently has been used for fall prevention training [1,2].
- The purpose of the study is to test the efficacy of a novel VR fall prevention tool that includes slip-trip perturbations compared to real-world slips and trips on limits of postural stability (LOS).

METHODS

- A total of 15 healthy young adults (8 females, 7 males, age 23 ± 3.31) completed two training conditions, real gait training (RGT) and virtual environment gait training (VEGT), which included real and virtual slip and trip hazards, in a counter-balanced order with baseline (BL) and post-RGT and post-VEGT.

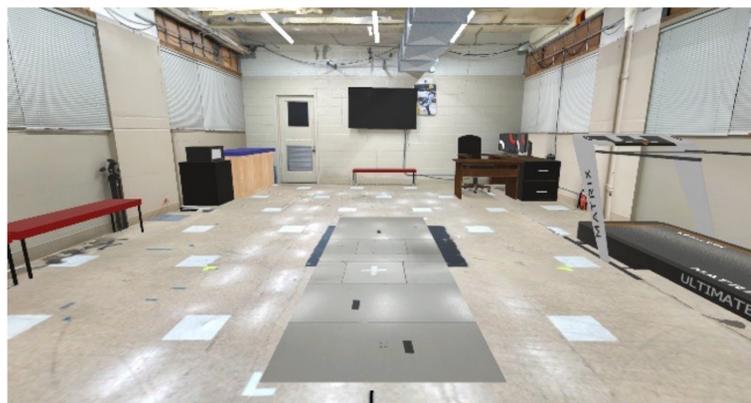


Figure 1. Experimental procedures of slip and trip gait training in RGT (top) and VEGT (bottom).



METHODS

- Center of pressure (COP) sway area in four different quadrants [anterior left (AL), anterior right (AR), posterior left (PL), and posterior right (PR)] during the LOS test [3] was assessed using a one-way repeated measures ANOVA at an alpha level of 0.05.

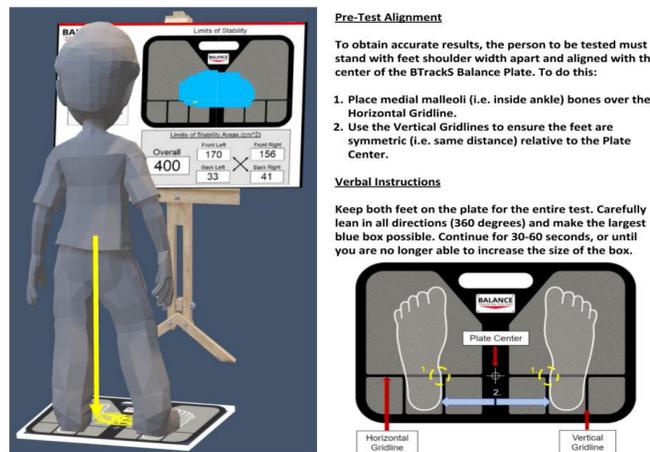


Figure 2: The BTrackS LOS Protocol

RESULTS

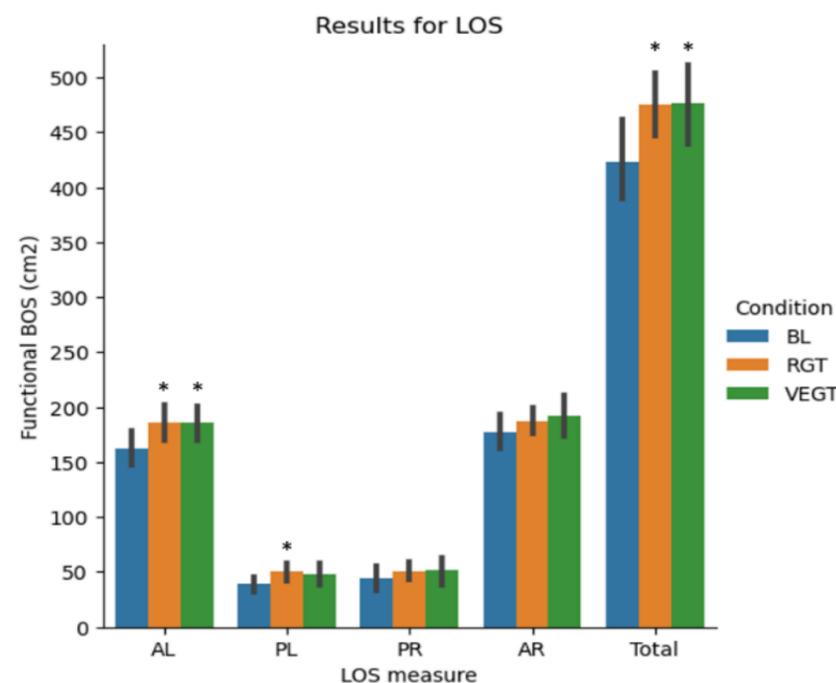


Figure 3. Functional BOS area (cm²) for total and quadrants at Baseline (BL) and post Real Gait Training (RGT) and Virtual Environment Gait Training (VEGT). Significant differences of $p < 0.05$ from BL are indicated with * and bars represent standard errors.

RESULTS

- Significant main effects were found in the PL ($p=0.04$) & AL ($p=0.01$) quadrants along with total score ($p<0.001$).
- For the PL quadrant, pairwise comparisons revealed significant increases in sway area in post training in the real-world compared to pre-training ($p=0.04$).

DISCUSSION

- The AL and total sway showed significantly greater LOS area in post-training in the real-world compared to pre-training, as well as in the post-training in VR condition compared to pre-training.
- Findings suggest that the VR training tool was equally effective as the real-world training, and significantly improved participant's LOS, which demonstrates a reduced risk for fall and fall-related injuries [1,3].

CONCLUSION

Exposure to slip and trip hazards during gait training in both real and virtual environment improves limits of postural stability and thereby minimizing risk for falls.

The novel VR fall prevention training tool provides an effective, feasible, low-cost, at-home training for fall prevention.

REFERENCES

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